Space Weather Forecast

Issued on Saturday, 16 September 2023 at 01:14 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: Moderate Geomagnetic Storm G2 likely late UTC day of Saturday into Sunday. Chance of further Minor Storm G1 Monday. Chance R1 Minor Radio Blackouts throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate in the past 24 hours, with one Moderate-class flare observed from the large and most magnetically complex sunspot region near centre-disc. There are currently up to seven sunspot region on the Earth-facing side of the Sun, with the aforementioned region near centre-disc the most magnetically complex. Other sunspots were generally both simpler and in decay, including all of the remaining three larger magnetically bipolar groups.

There is a large 'filament' (arc of plasma) lying to the north of the most active sunspot group, in the northeast. This is perhaps therefore more prone to instability should large flares from the active region destabilise its southern end in its 30 degree plus span. Its position near the middle of the Sun and its size mean this is a feature to be monitored.

A visually weak Coronal Mass Ejection (CME) seen heading south and east on late Thursday evening satellite imagery has an uncertain attribution, however may be linked to the largest flare of the period. This has been modelled and shows a tentative hit of Earth in the UTC morning of Monday 18 September. There was a near-simultaneous large 'disappearing filament' observed from the northwest. This may be tied to an apparently northward-directed slow CME in the early hours of the current UTC day, although is considered not to be have any impact on Earth.

Solar Wind / Geomagnetic Activity: Solar wind parameters were perhaps most indicative of a possible 'CIR' (Co-rotating Interacting Region - a density increase that precedes some fast wind streams) that did not fully evolve into its associated fast wind - this may be the result of Earth's skirting the southern limits of the driving feature. The solar wind speed has been slightly elevated throughout, between 430-490km/s. The magnetic field was mostly weak or moderate, with the all important north-south component also varying weakly. Geomagnetic activity has a result of the above solar wind parameters was Quiet (Kp 1-2) throughout the period.

Energetic Particles / Solar Radiation: Solar radiation levels (high energy proton flux) was at mostly background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: There is a daily chance of Moderate-class flares, mainly from the changing sunspot region near the middle of the Sun. The previously active large but fading group in the northwest should leave the Earth-facing side over the coming UTC weekend, but the flare risk may be maintained by the return of another in the east, which may be the source for some large recent far-sided CMEs and, by inference, large flares.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2023. All Rights Reserved.

Met Office Space Weather Forecast

Solar Wind / Geomagnetic Activity: The geomagnetic forecast is of lower than average confidence. The main forecast elements are the 14/0745UTC CME (especially), and to a lesser extent the 14/2126UTC CME. An initial slight chance of G1 Minor geomagnetic storm from the 11 September CME and a fast wind will give way to a chance of G2 Moderate geomagnetic storm later in the UTC day of Saturday 16 September, bleeding into Sunday. From here, a further chance of G1 from the 14/2126UTC CME follows on Monday 18 September.

Energetic Particles / Solar Radiation: No solar radiation storms are expected.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	60	40	50	10
Strong	G3	No	10	10	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	40	40	40	40
Very Active	R3 to R5 X	No	5	5	5	5

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2023. All Rights Reserved.

Met Office

Space Weather Forecast

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	10	10	10
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2023. All Rights Reserved.